

material in which two different kinds of carbon fiber layers are provided. More specifically, in the first kind of carbon fiber layer, the carbon fibers are longitudinally aligned all in the same direction and then adhered to each other with an electrically conductive resin. As the second kind of carbon fiber layer, a nonwoven carbon fiber mat is employed. These different kinds of layers are then combined in various arrangements, as explained in the specification. For example, in one embodiment, the aligned fiber layer is sandwiched between two nonwoven mats. In a different embodiment there are two aligned fiber layers provided and the direction of alignment of the fibers in one layer is perpendicular to the direction of alignment of the fibers in the other layer. In a still further embodiment two aligned fiber layers are provided and a nonwoven mat is provided in between, with the resultant composite being sandwiched between two additional nonwoven carbon fiber mats.

The claims have been amended hereby to emphasize the above-noted features of the present invention.

Hamon relates to a coating to be provided on walls or the like in which the coating has electrical conductivity properties and is coated onto the wall. In Hamon, a first coating is provided that has a stickiness to it and then a thin veil of carbon fibers are adhered to the sticky first coating and pressed down with a paint roller. A third outer

coating is then provided.

Lennox et al. is cited for its showing of so-called carbon-carbon composites in which multiple carbon layers are built up and then a resin applied and subsequently heated to form the composite carbon-carbon structure.

Litant provides a synthetic resin composition in which a conducting material, such as carbon fibers or the like, is incorporated in an insulator or a nonconducting material in order to form an electrical conducting element.

It is respectfully submitted that the combination of selected elements from these references still does not meet the present invention, because in the first place it will be noted that Hamon provides only one layer of woven or nonwoven carbon fibers. The present invention always employs at least three layers at a minimum and, moreover, the layers themselves are of different structure.

Furthermore, once again although Lennox et al. teaches multiple layers there is no suggestion that the layers are of different structure. Lennox et al. simply mentions various kinds of fiber structures that can be provided but never says to use different kinds in the same unitary structure, as in the present by claimed invention.

Furthermore, it is respectfully pointed out that Litant as stated in column 1, lines 25-30, employs the conductive

material in a nonconducting matrix or insulator. This is not a feature of the present invention and certainly would not lead one with ordinary skill in the art to construct a layer of carbon fibers in which the fibers are longitudinally aligned in the same direction and adhered to one another by an electrically conductive resin matrix, as in the presently claimed invention.

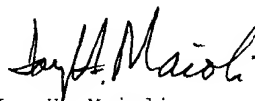
Therefore, by reason of the amendments made to the claims hereby, as well as the above remarks, it is respectfully submitted that a composite carbon fiber material having multiple layers in which the layers are themselves of a different structure, as taught by the present invention and as recited in the amended claims, is neither shown nor suggested in the cited references, alone or in combination.

The reference cited as of interest has been reviewed and is not seen to show or suggest the present invention, as recited in the amended claims.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE
IN THE CLAIMS

Please amend claims 1, 3, 5, and 6 by rewriting same to read as follows and cancel claims 7-10, without prejudice or disclaimer.

--1. (Amended) A composite carbon fiber material comprising:

a central layer formed of a plurality of carbon fibers longitudinally aligned in [a common] the same direction and adhered to one another by an electrically conductive resin matrix so as to form a sheet;

a first nonwoven carbon fiber mat arranged on a first flat surface of the sheet forming the central layer;

a second nonwoven carbon fiber mat arranged on a second flat surface of the sheet forming the central layer;

a first layer of thermoplastic resin applied to an exterior surface of the first nonwoven carbon fiber mat opposite the central layer so as to penetrate to the first flat surface of the central layer; and

a second layer of thermoplastic resin applied to an exterior surface of the second nonwoven carbon fiber mat opposite the central layer so as to penetrate to the second flat surface of the central layer.

--3. (Amended) A composite carbon fiber material comprising:

a plurality of central layers each formed of a plurality of carbon fibers [commonly aligned], wherein the carbon fibers in each layer are longitudinally aligned in the same direction, wherein the plurality of carbon fibers in each layer are adhered to one another by an electrically conductive resin matrix, and wherein the plurality of layers are superimposed on each other and mutually adhered by a thermoplastic resin, so as to form a composite layer;

a first nonwoven carbon fiber mat arranged on a first external flat surface of the [plurality of central layers] composite layer;

a first layer of thermoplastic resin applied to an external surface of the first nonwoven carbon mat so as to penetrate therethrough to the first external flat surface of the [plurality of central layers] composite layer; and

a second layer of thermoplastic resin applied to an external surface of the second nonwoven carbon fiber mat so as to penetrate therethrough to the second external flat surface of the [plurality of central layers] composite layer.

--5. (Amended) The composite carbon fiber material according to claim 3, wherein the plurality of central layers forming the composite layer comprises a first layer and a

second layer, the first layer having the plurality of carbon fibers thereof longitudinally arranged in a first direction and the second layer having the plurality of carbon fibers thereof longitudinally arranged in a second direction substantially perpendicular to the first direction.

--6. (Amended) The composite carbon fiber material according to claim 3, wherein the plurality of central layers forming the composite layer comprises a first layer and a second layer, and further comprising a third nonwoven carbon fiber mat juxtaposed and adhered between internal flat surfaces of the first central layer and the second central layer.